Progress of the Reclamation Service in Utah.

WRITTEN FOR THE NEWS BY PROF. G. L. SWENDSEN.

SINCE the passage of the reclamation law in 1902, the public press of Utah has spared no effort to secure to the people of the state an understanding of the provisions and advantages of the law, and the local division of the reclamation service fully appreciates the advantage that such support has afforded. Such co-operation indicates the early appreciation by the people of the state, of the benefits that would follow from the wise provisions of that act.

Irrigation had fully passed the experimental stage in Utah. Fifty-five years of experience were sufficient to demonstrate the superiority of irrigated farms over any others. In the older settled districts of the state many of the canals had been used so long that they were out of date, and the farmers of such localities were so far advanced that they fully appreciated the fact, that a rectification of existing systems and conditions was of primary importance to future substantial success.

This does not mean that the operations in the development of these systems in the past have been unwise. On the contrary, the co-operative plan by which these systems have been developed, has been so eminently successful that the benefactors are now in such condition that they can readily undertake the extension and perfection of these systems on such a comprehensive plan as to secure the most complete and permanent results.

In appreciation of this condition the attention of our force was first called to the necessity for investigating the existing conditions in these older irrigated districts in the belief that a plan might be developed whereby the entire condition could be perfected under the provisions of the reclamation law. These notions have been the controlling factors in the choice of the projects that should receive first consideration in Utah, and led to the conclusion that the more complete control of the Utah Lake water supply, the full development of the Bear river and its tributaries, the securing of an additional supply of water for Utah county, and finally, the complete control of all the important streams tributary to Great Salt Lake, should form the basis for the operations of the reclamation law in Utah as a basis for the first benefits to be received.

While our detailed examinations have been governed by this conclusion, our general operations have extended over a much broader area, especially in so far as they relate to the hydrographic data that is of so much importance in the irrigation development.

The accompanying map serves to show the extent of this latter work as well as to indicate the general hydrographic conditions within the greater part of our state.

UTAH LAKE PROJECT.

The project of first importance to the state is that contemplating the more complete control of the Utah lake waters, and the perfection and extension of the systems pertaining to that section of the state. So much has been said of the project that its general features are well known, though the great importance attached to the matter may not be fully comprehended. For the past three years hydrographic conditions have been such that the bed of the outlet channel has been above the surface of the lake the greater part of the time, and as would be the case in any reservoir where the outlet was above the water surface, if any water is secured it must be pumped. Much may be said in commendation of the men who were the means of securing the installation of a plant to secure the farms in the Jordan valley from desolation.

This improvement, however, does not accomplish all that should be undertaken in the matter of controlling the situation. Would there not be a great step in advance and more security attained if all of the 500,000 acre feet of water in the lake below the level of the Jordan could be depended upon if needed? Four years' supply at the rate used in 1904, lies below the level of outflow. Should this remain unused from year to year with land values increasing, and so many barren acres susceptible to redemption?

The area irrigated in the Jordan valley this summer was 45,684 acres. The area of the Lake is twice that number of acres. The watershed draining to the lake is about 2,000,000 acres. Do these figures suggest to the farmers of Jordan valley that some inefficient factors must intervene between their farm ditchs and the source of water supply?

From information available to us, we have estimated that in some of the highwater years such as 1895, twice as much water as you used this season was wasted into the Great Salt Lake, and that the aggregate of such waste from 1883 to 1900 was 7 to 8 years's supply. Will you afford such a waste again?

I have not available figures showing the annual maintenance change under your existing canal systems, but I think I am safe in saying that the prospect for a decrease is not bright.

I have followed this peculiar plan of discussing this subject, in order that you may get an idea of some of the notions which have been fixed in my mind in the time I have had this project under consideration. The answers to the questions suggested must control your action in reference to such improvements as may be suggested later for your consideration.

While the situation in general is much complicated, our investigations result in two important conclusions.

First—The full duty of the lake is not being realized.

Second—The canal systems through the canyon division are seriously in need of rectification. The accompanying may serve to indicate the complex nature of the water problems under the project. The main streams supplying the lake water are much used for irrigation. The settlement of all existing rights on these streams is of the utmost importance, and must be accomplished before the project can be fully defined. This matter, of course, cannot be undertaken except under the state irrigation law by the state engineer.

The possibilities relating to extension and improvements of the entire Utah lake system are well advanced, and I may add in conclusion that our office is probably fully abreast with the landholders in the efforts to consummate the scheme.

BEAR LAKE PROJECT.

This project contemplates the complete control of the Bear river and Bear lake water supplies for the irrigation of such of the available lands as may seem susceptible to the benefits of the project. The extent of the project is very great, and is very well outlined in the second annual report of the reclamation service. On the accompanying map several tracts of land susceptible of irrigation under this project are indicated as Bancroft, Marsh, Oxford, Cache, and Malad valleys. In these sections the largest areas are located and the possibilities of the project may be said to extend as far south as Ogden.

The ordinary canals such as taken from the mountain streams, are not possible on the Bear river, if a comprehensive system is contemplated. The topography is such that very long canals are needed to reach the main bodies of land, and a complete examination of the situation is necessary to enable us to make plans for a comprehensive system. The possibilities are very great, and the project will doubtless receive the earnest consideration of the landholders.

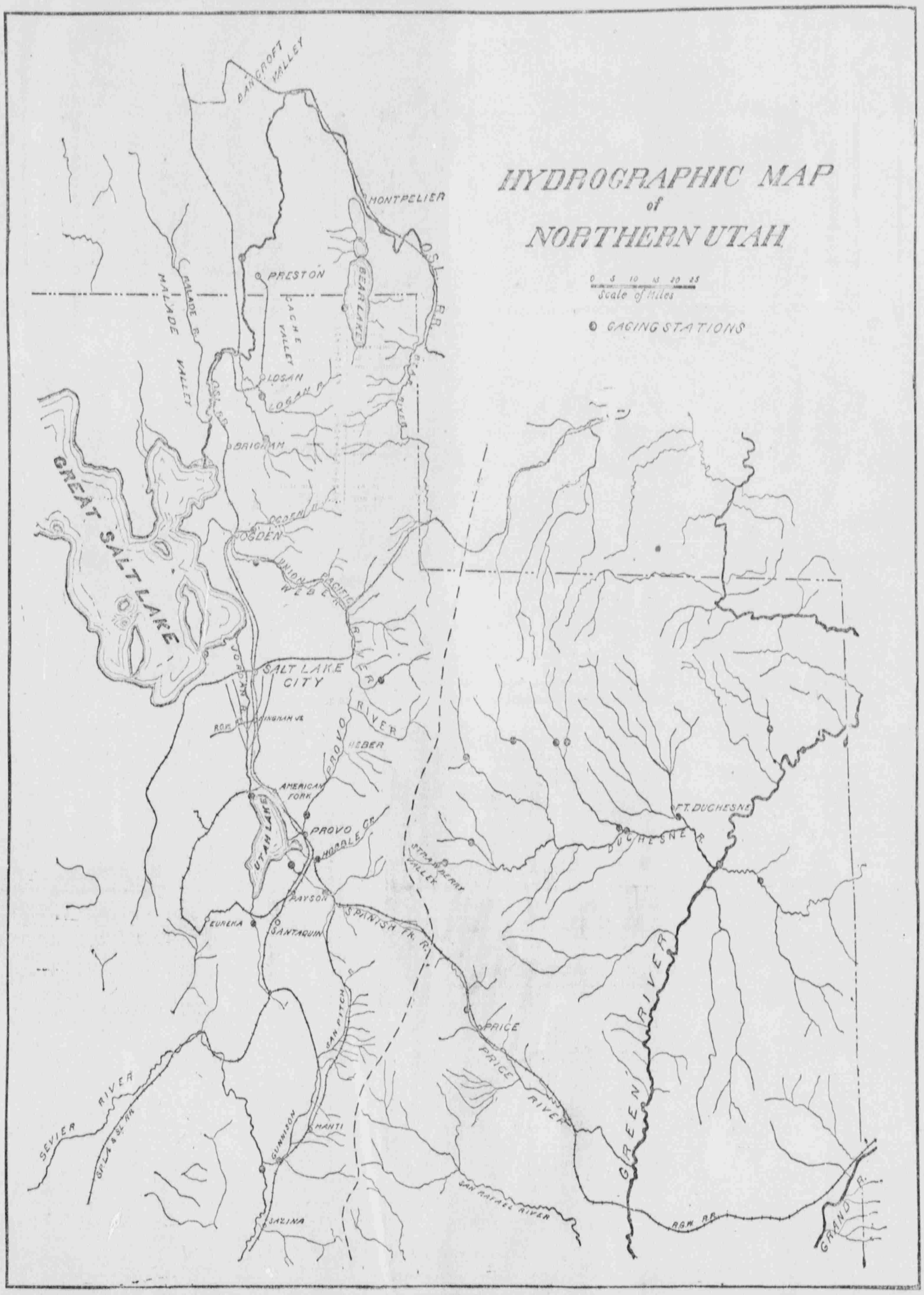
The storage of the Bear river floodwaters can be readily accomplished in the Bear lake by a diversion channel a short distance east of Montpelier. Some very long canals will be necessary to reach the best areas of land, but I am of the opinion that the system will be found entirely feasible.

In the complete examination of the possibilities more than 400 miles of line have been examined, and all lands classified in a general way. Apparently all interests can be readily co-ordinated and there exists a very general sentiment favorable to the project.

STRAWBERRY VALLEY PROJECT.

Utah county has large tracts of land not supplied with water, and in contemplation of their complete reclamation, examinations have been made relating to the feasibility of diverting some of the Duchesne river water into this basin. This scheme contemplates storage in the Strawberry valley beyond the rim of the Great basin. The storage site is noted on the accompanying map. The best lands susceptible of reclamation under this scheme are in the vicinity of Spanish Fork, Payson, and Santaquin, and would be very valuable if irrigated. I am not prepared to announce any results in relation to this project, but the great interest of the farmers concerned is a matter worthy of note.

General examinations have extended to other possibilities within the state but progress is not sufficient to warrant an expression of opinion relative thereto.



MAP STORY OF WHAT UNCLE SAM HAS DONE IN 1904 TOWARDS RECLAIMING UTAH'S ARID LANDS.

THE YEAR'S WEATHER AND CROP CONDITIONS AS SHOWN BY GOVERNMENT RECORDS.

THE weather during the year has presented few remarkable features aside from those variations common to the different seasons. During the winter, snowstorms were numerous and severe over the northern part of the state, in decided contrast to the weather that prevailed over the southern part, where the prevailing drouth, while relieved to some extent during March, was not thoroughly broken until May. The only other remarkable feature of the year's weather worthy of special mention was the long period of dry weather that prevailed during the latter part of October and practically all of November. This long continued period of drouth was most unusual and the local weather office records fail to reveal any similar experience.

The first snow of the season fell during November of the previous year over the northern half of the state. The fall during that month was particularly heavy over the extreme northeastern part of the state, but practically no snow whatever fell over that part of the state south of Utah county. Like conditions largely prevailed during the following month, only the northern tier of counties securing an average amount of snowfall. To the southward, less and less snow occurred, until in the extreme south there was no precipitation. During January, the same conditions continued. The snowfall in northern Utah was far above the average. Over the central counties the amount was about normal, but over the southern part the precipitation was very light and scattered. An average amount of snow and rain fell during February, but over the middle and southern counties the precipitation was as usual below the normal.

EXCESSIVE PRECIPITATION.

During March, the precipitation was excessive over the northern half, and somewhat above the average over the southern part of the state. At the close of March, an excellent water supply was assured over the northern half of the state. The heavy rains and snows of March were driven into the mountains by high winds, and the snow in the canyons was packed almost as solidly as ice. Over the southern half of Utah the chief snow supply fell during this month, and well grounded fears were entertained that the season's supply of irrigation water would be insufficient for the season's demands. April's precipitation was below the normal, the weather being generally dry until the last decade when a severe snowstorm passed over the state, and in some localities in the northern half, the snowfall was very heavy, noticeably at Salt Lake City where the amount recorded was far in excess of previous records for April.

ALSO ABOVE NORMAL.

During May, the precipitation was decidedly above the normal, being particularly so over the middle counties. This precipitation was mostly in rain, although considerable snow fell in the higher altitudes early in the month, being more general over the southern mountains. These rains were specially opportune for the southern counties where abnormally dry weather had prevailed generally until this month. During June, the precipitation was slightly above the normal. Two thunderstorm periods passed over the state, but these storms were of moderate intensity. During July, the same like conditions obtained during August when the precipitation was exactly normal. September was a notably dry month, and the precipitation was much below the normal. During October, there was a marked excess in precipitation over the northern counties, but for the rest of the state the precipitation was about normal. November was remarkable for the long continued drouth which extended from Oct. 17 until about the first of December. The rainfall for the current year up to the date of writing has been in considerable excess over the record of the year previous, mainly owing, however, to the excessive fall of snow over northern Utah during the winter, and the heavy rains that occurred during May. For the remainder of the year, the precipitation was either normal, or as happened during the recent fall, has been decidedly below the average amount.

CLIMATIC CONDITIONS.

During the winter months of the current year, there was an unusual amount of cloudy weather. For weeks the sun was either invisible or shone dimly through thin layers of upper cloud stratas. The temperatures for January were much below the normal, noticeably over the middle counties of the state. This was in marked contrast to the temperatures obtaining for February, which were even more above the normal than the temperatures of the previous month had been below, the abnormally high temperatures increasing from the northern limits of the state southwards. During January, almost all the stations reported minimum temperatures far below zero. The lowest reported temperature from any station being 23 degrees below zero, at Plateau, Sevier county, Jan. 26. In February, however, as can be assumed from the abnormally high temperatures that prevailed during the month, there were stations reporting zero temperatures, although the lowest reported temperatures this month, 26 degrees below zero, in Summit county on the 10th, were lower than the absolute minimum of the previous month. The zero temperatures, however, during February were mostly reported from the more elevated districts of the state.

The temperatures during March were generally normal over the northern part of the state, few stations reporting zero temperature; but southward, the temperatures rose to above the normal. This month was exceedingly stormy and unsettled, one storm following on the heels of another. During April, aside from the severe snowstorm that prevailed during the last decade already mentioned, the weather presented no unusual features, though the cloudiness as was the case through the winter, was still excessive. The temperatures during this month were slightly above the normal. There were many clear days during May, notwithstanding the excessive precipitation in that month, and there was in consequence considerable bright sunshine.

ADVENT OF SUMMER.

The summer season began to manifest itself during this month, with its usual clear skies and abundant sunshine. Frequent thunderstorms marked July, and high winds were frequent. Temperatures, as during the previous month, continued below the normal. Temperatures were not unusually high for this month excepting over some parts of southern Utah, the maximum for the entire state reaching 109 degrees at Green River, Emery county, on the 25th inst. Throughout the northern section of the state there were few stations where the mercury reached or passed the century mark. Remarkably stormy and unsettled weather for midsummer, prevailed during August. Thunderstorms were frequent and severe, especially over the southern part of the state. A noteworthy feature of the month, was the severe frost that formed over the elevated districts, damaging vegetation considerably.

However, the storms during the month were very beneficial in having replenished the streams and reservoirs throughout the state, and in many localities these were filled to overflowing. The temperatures for this month were generally slightly below the normal. During September, exceptionally fine weather prevailed. Near the close of the first decade the highest temperatures obtained during an extended period of clear sky. The amount of sunshine during this month, was excessive, in marked contrast to the previous month. In the late part of the last decade following a stormy period temperatures took a decided drop and killing frost was reported generally over the state. Temperatures during the month, were on the whole slightly above the normal.

October and November were remarkable for long extended periods of fair weather. For weeks at a time, scarce a cloud flecked the sky, and the sun shone day after day uninterruptedly from morning until night. This long extended period of drouth towards the close of the fall was having its effect upon the soil which from lack of moisture had been gradually converted into a fine dust or more properly speaking, flour, which the slightest breeze would carry up into the air where, owing to the extreme fineness of the dust particles, they would remain suspended, producing a hazy atmosphere that obscured the mountains surrounding the city, and at times rendering them almost entirely invisible. Temperatures during October were almost exactly normal, but during November, owing to the abnormally clear weather, temperatures were much higher than the average.

CROPS.

The growing season of 1904, can be classed as an highly successful one, and the yield of crops was generally all that could be desired. Throughout the northern half of Utah, conditions were favorable from the start. The abundant fall of snow during the winter and its closely packed condition at the beginning of spring had even at that time ensured a sufficient supply of irrigation water for the use of the crops during the entire season. In addition, the abnormally large snow fall had soaked the ground to a great depth, a condition that subsequently was of enormous benefit to arid land crops. The yield of these unirrigated crops was the largest in the history of the state. They were, too, of excellent quality everywhere, but particularly in northern Utah; and the yields from arid farms were far above even the most sanguine expectations. The immediate effects of these surprising returns has been to give a marked impetus to the raising of arid land crops and the acreage for the coming season has in consequence been greatly increased, a proceeding that might prove disastrous in many instances where the soil is not properly adapted for that purpose. The great success of these crops during the current year can in a great measure be attributed to the abnormal precipitation during the past winter, and failures are liable to result in many instances where good crops have been raised before, unless the precipitation during the coming winter equals the past. The southern half of the state was not favorably circumstanced regarding the supply of winter moisture, as has already been noted. Dry weather has prevailed throughout that region during the winter, and continued mostly throughout the spring. But the heavy rains that fell over that section during May, relieved the dryness of the soil and effectually dispelled any fears that had been entertained regarding the supply of the necessary moisture for the growing crops.

During the spring, farm work had been backward until the latter part of April when favorable conditions allowed rapid progress to be made, and by the close of the month the seeding of spring wheat was well advanced and nearing completion in many localities. Beet planting, too, was under rapid headway and was completed during the early part of the following month. For the remainder of the month, the crop made rapid headway, and thinning was in progress. Sheep shearing had begun the latter part of March and continuing during April, had been completed during May. The clip was on the whole satisfactory. Stock wintered well, and the advent of spring found it in fine condition. During the entire spring season, the ranges were in excellent condition, and stock in consequence thrived. Fall wheat began to come up during the middle of April and by the close of that month was practically all up to a good stand and looking well, maintaining this condition during the following month. Lucerne suffered some from frost in the spring, and many fields were found to be winter killed. Fruit on the other hand was injured comparatively little from the frost and was in good condition. Under the influence of warm weather and a long period of bright sunshine, all crops made rapid advancement in May and June. At the close of the latter month, fall and early sown wheat were heading out, and harvesting had begun in the southern part of the state. By the middle of July fall grain was practically all harvested, and threshing had begun during the last decade, being completed about the end of August, with the surprising yields already mentioned. The harvesting of spring wheat and oats followed soon after, and by the close of September threshing of all crops was practically over. The yields of spring grain were fully up to the average. The first crop of alfalfa had been secured in June, with yields above the average. At the same time, the second crop was in thriving growth, and during the latter part of July was harvested with a yield fully equal to the first. The third crop was gathered during August, but on the whole was not as good as the preceding crops. Sugar beets were in thriving condition, and suffered little through the season. The harvesting began late in September with satisfactory yields in quantity and quality in all sections.

Fruit suffered some drawbacks during the season, but in the end the yields were generally good and plentiful especially apples. Potatoes, tomatoes and other tender vegetables while on the whole thriving, were badly damaged from the frost of Aug. 21, many potato vines being killed at that time, although the injury to tomatoes was far greater. At the close of August, the canning of the last named crop was proceeding rapidly. The close of the growing seasons found the ranges in flourishing condition, and promising much feed for the winter. Sheep and cattle were approaching winter in splendid condition, and despite a few drawbacks, the season of 1904 may with justice be considered the most successful that has been known since the state was opened up for settlement.